

papers, but the people were very full of it in Graaff Reinet. It is now about a month since we first noticed it."

M. CAREY-HOBSON

#### Pons' Comet and Meteors.—The Quadrantids

I SEE in Greg's list of possible cometary radiant points there is one given for Pons' Comet, the date December 6, radiant point R.A. 200°, N.D. 68° 5'. The radius-vector of the comet at its descending node is 0.77, so that the likelihood of a shower of meteors seems very small; but it might be worth while to look out for one on the 6th of next month.

Pons' comet was just visible to my naked eye on the evening of the 19th—visible only by rare glimpses. On the 20th it was easily visible with the naked eye, almost steadily, so that it would be about of the 7th magnitude. Its tail is still very faint with a 4½-inch refractor, and grows very slowly.

I would call the attention of observers of meteors to the favourable circumstances attending the next shower of quadrantids, as regards absence of moonlight and the convenient time at which the maximum will be reached. On the other hand, the radiant point will be low at that time, thus diminishing the number of meteors visible. I have examined my observations of this shower in 1859, and from 1872 to 1883, and find that the maximum takes place when the sun's longitude is nearly 282°. This will correspond at the next apparition to the middle of the night of January 2. The duration of the activity of this shower is short compared with that of some other periodical showers, and I am making a more minute calculation of it, the result of which I purpose sending to the *Astronomical Register*.

Sunderland, November 27

THOS. WM. BACKHOUSE

#### Meteor

A REMARKABLE meteor appeared in the eastern sky this evening at about 8.30. Coming out of *Cetus* it travelled slowly towards *Orion*, being visible for five or six seconds. The head was rounded in front, about one-eighth of a degree wide, tapering backwards to the length of half a degree, distinctly bluish in colour, and leaving an indistinct trail of about twice its own length behind it. It was so bright and seemed so near that I took it at first for a firework of some kind. But it was undoubtedly a meteor. It died out silently, and without breaking up, at about 15° from the horizon.

F. T. MOTT

Birstal Hill, Leicester, November 20

#### Some Habits of Bees and Humble-bees

HAVE any of your readers noticed, or can any account for, a curious practice which I observed on several fine days this autumn among the humble-bees that frequented a bed of blue salvia, viz. that in piercing the calyx and upper end of the tube within it, they would invariably attack it on its *right-hand side*, i.e. the right side of the flower as it looks straight out from the stem. After having several times counted fifty or sixty such attacks in succession, I gathered a number of flowers at random and, carrying them indoors, requested my brother to lay each on its side, so as to show the hole uppermost; twenty-five out of twenty-six were without hesitation placed with the *right* side exposed, the remaining one was considered doubtful. The apparent rule of proceeding was this:—The bee alights on the under midrib or keel of the calyx, with her head towards the stem, then turning her head and fore feet slightly round to the right, inserts her proboscis just clear of the rib, the process being visible only to a person standing on that side of the flower. Whether the flower was on the north or south side of the bed, in shade or sunshine, made no difference, nor did it matter in which direction the bee was making her circuit round the bed. Where two flowers hung so close together as to touch, after piercing the right-hand one on its outer side, and satisfying herself that she could not conveniently push her way in between the two, she would fly off to another, losing the honey rather than attempt to reach it through the left side of the flower. This occurred repeatedly.

Is there anything in the structure of the calyx or in the position of the nectar that can explain this? Or is there a right and left-handedness in some families of humble-bees? Or can it be that a habit, perhaps accidentally established, may be rigidly pursued for a time, at the risk of occasional small losses, to be afterwards abandoned when the impulse is worn out, or when the results are found to be not worth the trouble of form-

ing the habit? That small gains are sometimes neglected in obedience to a habit of quite recent formation, I had an instance a few summers ago, when watching a number of hive bees on a plant of common fuchsia. The greater part of its flowers had been pierced in the upper tube (probably by humble-bees), and my attention was drawn by the regularity and exactness with which the bees were flying straight to the tube, contrary to their usual practice of entering from below. But the flowers were not *all* pierced; and this was the curious part: when a bee had run round the tube and ascertained that there was no hole, she would give it up at once and fly to another, as though the pressure of the new habit would not permit any occasional recurrence to the good old-fashioned plan of entrance from below. Can blind obedience to an *order* given out by a superior have any place in apiary economy?

In this instance it was clear that the habit was fully formed, as regarded that particular plant: I tried to witness its commencement on another, and accordingly pierced as many flowers as I could reach on a fuchsia growing at some distance from the first. A few bees discovered my holes and made use of them, after which they showed considerable hesitation and confusion in their mode of attack, losing much time in hovering up and down as though thrown out of their usual routine; while on unpierced neighbouring plants the customary precision of aim at the lower opening of the corolla prevailed without interruption.

Reverting to the humble-bees on the blue salvia. That their piercing the flower *at all* is an occasional and not universal practice I am inclined to believe, from the totally different behaviour of a set of *apparently the same species* (though of this I cannot be certain) on the same plants during the early part of last autumn. Alighting on the lower lobe of the corolla and advancing inwards, the bee's weight forced open the throat of the flower, into which she then easily inserted her head. This plan was pursued with as much regularity as the opposite one was this autumn. On the same days it was amusing to observe the many fruitless attempts of hive bees to effect an entrance in the same manner. Their bodies being too light to weigh down the floor of the corolla, they would try in vain to force their heads in and always had to fly away disappointed, except when one more fortunate than the rest discovered a flower that had dropped from its calyx, when she would eagerly insert her proboscis into the open end of the tube.

Seeing their great anxiety to obtain salvia honey, I eventually expected to find them taking advantage, this year, of the holes ready made for them by the humble-bees, but strange to say they appeared to have quite deserted the plants, though swarming on a neighbouring bed of yellow *Tagetes*, an occasional wanderer only passing amongst the blue flowers, and without alighting.

ISABELLA HERSCHEL

Collingwood, Hawkhurst, November 21

#### Rudolphi's Rorqual

IN a communication made to the Zoological Society on the 20th inst., when describing a specimen of Rudolphi's Rorqual (*Balenoptera borealis*), lately captured in the River Crouch, Essex, I said that this was the first well authenticated example of this species taken in British waters. My friend, Mr. J. E. Harting, has kindly called my attention to a paper which had for the time escaped my memory, published by Prof. Turner in the *Journal of Anatomy and Physiology* for April, 1882, in which a specimen is described which was captured near Bo'ness in the Firth of Forth in September, 1872, and of which the skeleton is now preserved in the Anatomical Museum of the University of Edinburgh.

W. H. FLOWER

November 22

#### Reflection of Light

AS showing how far under favourable conditions the reflection of light from a cloudy sky is visible, I may perhaps be allowed to mention that last night at nine o'clock the reflection of the London lights was remarkably strong. The sky was uniformly covered by a dense canopy of moderately high cloud, and the air very moist (humidity 95). Under such circumstances I have frequently seen at the same time the reflection of the London Brighton, Eastbourne, Hastings, and Tunbridge Wells lights, but last night this reflection in the case of London was peculiarly strong. In former years the light was of a reddish yellow, as is still the case with the lights of the other places named. But

in the case of London, and less but perceptibly so in that of Brighton, the light has become of a more silvery hue, due doubtless to the extensive use of the electric light. The distance between this place (lat.  $51^{\circ}$ , long. 0) and London is about thirty-five miles in a direct line, and there is no place of any size between these points, so there can be no mistake about it; and that the reflection of light at such a distance should be visible seems worthy of notice. It would be interesting to know how far, under favourable atmospheric conditions, the reflection of the London lights can really be seen. W. J. TRENTLER

Fletching, Sussex, November 22

### A Lunar Rainbow

ANY of your readers who happened to observe the heavens on Saturday night, the 17th inst., at about 11.15 to 11.30, could not fail to notice the beautiful lunar rainbow which was then visible. Though the moon had slightly passed its perigee, it was shining with such dazzling brilliance that the marbled shadows on its surface were almost effaced, and it hung in the heavens like a spotless crystal sun. The very stars seemed farther away, as though they had shrunk back, ashamed and frightened by the silver glory. Jupiter and Sirius alone stood fearless and undaunted—the former, below her to the left, as if in attendance, the latter far away in the starless south. A few featherlike clouds which the moon illumined with a splendour of her own, now and again sailed in stately silence across her path, but that portion which spread directly over her face, seemed to melt and become invisible like a snow flake on a warm hand, so that the cloud floated around her as a veil, fringing but not covering her face. It was when surrounded by one of these clouds that the rainbow became visible. I had never seen one before, so cannot say whether it was more distinct and bright than is usually the case, but I could see most vividly the red, yellow, green, and violet bands with their intermediate shades. The bow seemed formed on the cloud that shaded the moon at the time, and lay round her in a perfect, though comparatively small circle. It remained so for some nine or ten minutes, and then faded gradually away into a luminous halo of golden brown. Those of your readers who were fortunate enough to behold this beautiful phenomenon will, I am sure, agree with me that it was a sight not to be forgotten. J. C. KERNAHAN

The London Institution, November 24

### Sudden Stoppage of Clocks

I HAVE four clocks in my house; one is on a wall that bears north-east and south-west, while the other three ranged nearly at right angles about north-west and south-east. The times of these clocks were not exactly together, there being from five to fifteen minutes between the times; but all of them stopped on the morning of November 18 at times as recorded by each between 3.25 a.m. and 3.40 a.m. Have any other clocks stopped on the same night? This place—Lurgbrack, Letterkenny, Co. Donegal, is in lat.  $54^{\circ} 56'$  and W. long.  $7^{\circ} 41' 52''$ . Letterkenny, November 19 G. HENRY KINAHAN

### Fog Bows

ON November 14, when driving about half way between Convoys and Letterkenny, Co. Donegal, I observed a very complete bow at about 1 p.m., due solely to a fog. For the most part it was quite white, but at the springing there were slight traces of prismatic colours. On November 15 at 7 a.m. at Letterkenny there was also a fog bow; this, however, had all through well developed prismatic colours. The 15th afterwards came on a heavy wet day; the 16th was fine; but since then there have been severe winds accompanied with sleet, snow, and rain. G. H. KINAHAN

Letterkenny, November 19

### THE EARLY HISTORY OF THE HERRING<sup>1</sup>

THE Admiralty having intimated on July 31 that they were prepared to grant the use of a gunboat to enable the Board to undertake some investigations into the early

<sup>1</sup> Preliminary Report of the Investigation Committee of the Fishery Board for Scotland.

history of the herring, the convener of the Committee appointed to carry on these inquiries made as complete arrangements as was possible in the limited time, and, along with Sir James R. Gibson-Maitland, proceeded to join Her Majesty's gunboat *Jackal* at Invergordon on August 6. Besides making preparations to collect material to illustrate the growth of the herring during the early stages of its development, it was thought desirable to make arrangements for the examination of the spawning grounds, in order to ascertain under what conditions the spawn was deposited. To assist in the work Mr. J. Gibson, D.Sc., of the Edinburgh University Chemical Laboratory, and Mr. J. T. Cunningham, B.A., of the Zoological Laboratory, were invited to join the expedition.

The trawls, dredges, and other appliances were taken on board on August 6, and on the following day the *Jackal* left Invergordon for the Moray Firth, and began the work of investigating the inshore spawning grounds lying between Wick and Fraserburgh. Each place examined was indicated by a number on the chart, and will be spoken of in the Report as a "station." During the month the *Jackal* was at our disposal sixty stations were made, and nearly as many by the *Vigilant* from the time she relieved the *Jackal* to her return to Granton on October 6. The plan generally adopted at the various stations consisted in (1) taking the depth and the surface and bottom temperatures; (2) collecting samples of water from the bottom, and of the mud, sand, &c., brought up by the sounding apparatus; (3) noting the nature of the surface fauna taken in the tow-net; and (4) examining and, when necessary, preserving the animal and vegetable forms brought up by the trawl, dredges, and tangles. In this way there has been collected a considerable amount of raw material, from which important results will in due time be obtained.

Not the least interesting part of the work consisted in experimenting with herring ova which were successfully artificially impregnated and developed. At first experiments were made with spawn obtained at Helmsdale on August 7, from herring which had been several hours out of the water; but the results being unsatisfactory, it was determined to obtain, if possible, the roe and milt from living fish. We, therefore, frequently remained during the night on the fishing ground, and boarded the herring boats when the nets were being hauled. The fishermen, always pleased to see us, rendered every assistance in their power. Selecting ripe fish, we expressed the roe and milt on squares of glass, which were then placed in carrying boxes specially designed for the purpose. The boxes were conveyed by the *Jackal* to a small laboratory near Geanies, which had been kindly placed at the disposal of the Committee. Once at the laboratory, the glass plates, with the developing eggs firmly adhering to them, were transferred to hatching boxes, through which a constant current of water flowed from a large tank. In from three to five days well-formed active embryos were visible through the thin transparent egg membrane, and in ten days we successfully hatched fry from the artificially impregnated ova. We soon discovered that success depended on having an abundant supply of pure sea-water at an equable temperature. Unfortunately, just as our arrangements for experimenting on a large scale were completed, the herring fishing in the Moray Firth came suddenly to an end, and it was impossible to obtain further supplies of eggs.

We next directed our attention to the nature of the surface forms, which are believed to supply the principal food for the herring fry, and when this, on account of the weather, was no longer possible, we proceeded to examine the mussel scalps in the Dornoch, Cromarty, and Inverness Firths.

As a full account of the autumn's work will be presented to the Board in time for the Annual Report, only a short statement is now given, indicating rather the